



NASA SBIR 2011 Phase I Solicitation

X3.02 Crew Accommodations and Waste Processing for Long Duration Missions

Lead Center: ARC

Participating Center(s): GRC, JSC, KSC, MSFC

Critical gaps exist with respect to interfaces between human accommodations and life support systems for long duration human missions beyond low Earth orbit. New technologies are needed for management and processing of human fecal waste and for clothing and laundry. Proposals should explicitly describe the weight, power, volume, and microgravity performance advantages.

Human Fecal Waste Management

Microgravity technology is needed to collect, stabilize, safely, recover useful materials, and store human feces or its processed residuals. Simple low energy systems that recover water and sterilize/sanitize feces or mineralize it to minimal residuals (and perhaps gases or fuels) are desired. Complete systems are desired that include consideration of preprocessing, processing, and venting or containment for storage of the resultant residuals and/or recovered materials.

Clothing and Laundry Systems

The requirements for crew clothing are balanced between appearance, comfort, wear, flammability and toxicity. Ideally, crew clothing should have durable flame resistance in a 34% O₂ (by volume) enriched environment. Fabrics must enable multiple crew wear cycles before cleaning/disposal.

The laundry system should remove or stabilize the combined contamination from perspiration salts, organics, dander and dust, preserve flame resistance properties, and use cleaning agents compatible with water recovery technologies, including both physiochemical and biological processes. Proposals using water for cleaning should use significantly less than 10 kg of water per kg of clothing cleaned.